A STUDY INTO THE EFFECT OF SHOPPING SITUATIONAL FACTORS ON ONLINE IMPULSE PURCHASING INTENTION OF CONSUMER—REFERENCE GROUP'S REGULATION*

XIAOBO LIN
Panyapiwat Institute of Management, Thailand

E-mail: xiaobolin1853@qq.com

Abstract

In recent years, the development of mobile Internet has brought online shopping into a new stage. Under the influence of new marketing models such as live broadcasts and short videos, online impulse buying is becoming more and more common. However, the formation process of this phenomenon has not yet reached a consensus conclusion. This paper discusses the influencing factors and generating process of consumers' impulse purchase intention in the context of mobile shopping. This paper proposes that the mobile shopping environment stimuli can affect consumers' impulse purchase intention by affecting the two emotions of consumers' perception and pleasure. At the same time, this paper also verifies the moderating role of reference group influence in the influence of shopping environment stimuli on consumer sentiment. The research adopts the questionnaire survey method to collect the data. After the data test, all the hypotheses are supported. Therefore, it is confirmed that the reference group influence has a moderating role in the influence of consumer emotional influence on online impulse purchase intention. The research conclusions can help e-commerce companies to further understand consumers' impulse buying behavior, make full use of the influence of reference groups, and formulate more flexible and effective promotion strategies.

Keywords: Online Impulse Purchasing, Shopping Situational, Consumer Emotions, Reference Group Influence

Introduction

With the rapid development of mobile Internet and 4G networks, the popularization of smartphones, and the continuous improvement of online payment methods, China's e-commerce has entered a new development model, and consumers' online shopping through mobile phones has become the norm. During the development of online shopping, China's e-commerce has experienced the development from platform e-commerce to social e-commerce to the current stage of live short videos. The shopping methods of online video and live streaming have more directly stimulated consumers. , making consumers' online shopping behavior more impulsive. Online platforms have become a "hotbed" for consumers to buy impulse. With the development of cloud computing, big data and other technologies, intelligent recommendation algorithms are constantly being upgraded, the shopping information recommended by online shopping platforms for consumers is becoming more and more accurate, platforms are becoming more and more "understood" of consumers, and consumers are naturally more and more unbearable. "Temptation", the impulse to shop. In the mobile shopping environment, due to the "fragmented" characteristics of shopping time and the

* Received: January 15, 2023; Revised: February 25, 2023; Accepted: March 31, 2023

electronic and non-stop characteristics of shopping places, consumers can shop anytime and anywhere, which has also resulted in the increasingly common impulse buying behavior. Impulse buying is a special way of consumption (Parboteeah D. V. et al., 2009). Some studies have pointed out that consumers in mobile shopping activities will be affected by mobile factors and personal factors on their willingness to adopt mobile shopping based on smartphones (Hubert M. et al., 2017), as well as consumers' perceived risk and risk in mobile shopping activities. Trust has an impact on consumer purchase intention (Marriott et al., 2018). In addition, studies have shown that product sales, seller credit, service ratings, online review length and store opening time have a positive impact on consumers' online purchase decisions (Li Zongwei et al., 2017). Some scholars have explored the impact of environmental stimuli in mobile shopping on consumers' continued purchase intention from the perspective of consumer sentiment (He Junhong et al., 2018). In addition, some scholars have deeply analyzed the influence of the presence or absence of promotional incentives and different promotional methods on consumers' satisfaction after impulsive purchases (Li Yalin et al., 2014). These studies indicate that there is a need to investigate consumer shopping behavior in the mobile shopping environment, especially the increasingly common phenomenon of online impulse buying, but how mobile shopping environmental factors affect impulse buying behavior, in this regard There are still some deficiencies in research.

Reference group influence is a key situational variable. In recent years, in the field of social psychology and consumer behavior research, a large number of studies have confirmed the involvement of reference group influence in the consumer decision-making process. And through experiments to prove that consumers' perception of informative influence affects their product evaluation. The works on interpersonal influence and social identity believe that people's consumption behavior is actually a way and means of social identity, and it is the process of maintaining or shaping individual social identity in the field of consumption.

However, in previous studies, there is a lack of relevant research on the relationship between reference group influence and consumer impulse shopping. Moscovici (1985) wrote about social influence and social identity. People's consumption behavior In fact, it is the way and means of social identity, and it is the process of maintaining or shaping individual social status in the field of consumption. In the field of consumer research, Ford and Ellis (1980) found that group members' brand preference was significantly related to group influence by considering group influence and group member brand preference. David (1983) believes that most people do not use too many ways to learn about products when making shopping choices. Instead, it relies on some small-scale, relatively fixed information sources, that is, reference groups, such as friends, family, advertisements, etc.

However, most of the above research trends focus on individuals conform to group norms (conform to group norms), or individuals adjust their value judgments based on the evaluation of others (modify their jedgements), rather than on individuals in a given environment (a given situation) will be studied below for a variety of social impacts. Few studies have emphasized the multiple dimensions of interpersonal influence and its impact on purchasing decisions.

From the research on online impulse shopping, it can be found that consumers are not only impulse buyers, but also users of the website system, because in the process of online shopping, consumers

Theoretical Basis and Research Assumptions

1. Theoretical Model

Based on the research of domestic and foreign scholars, it can be found that in the research on consumers' impulse buying intention and behavior in online shopping, scholars mainly use the S-O-R model. For example, scholar Eroglu has applied the S-O-R model to analyze online shopping activities and concluded that the establishment of online store environment will affect consumers' emotions and attitudes, and ultimately affect consumers' shopping behavior. The online impulse buying model of scholars Parboteeah et al. is based on the theory of environmental psychology, and examines the influence of the website's task-related (TR) function and emotion-related (MR) function on users' online impulse buying behavior. Therefore, this paper also adopts the stimulus-individual-response (S-O-R) model as the basic research framework, as shown in the figure below.

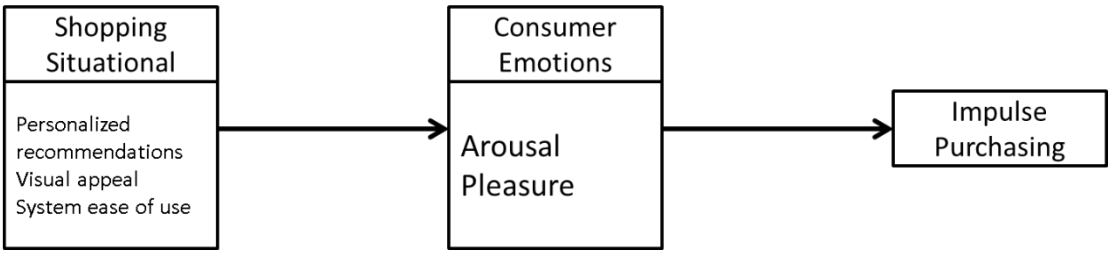

Figure 1: S-O-R Model

In using the model, this paper examines the stimuli of the mobile shopping environment: personalized recommendations, visual appeal, and the effect of increased system ease of use on consumers' online impulse purchase intentions. This is because impulse buyers often feel out of control over their buying tendencies and intrinsic behaviors caused by marketing incentives when visiting online stores. However, online consumers have dual identities and roles in the mobile shopping process. They are both impulse buyers and users of the website system, because the tasks involved in the purchase process require consumers to be proficient in operating various mobile devices. The most common is the mobile phone, which uses the shopping website system to complete the online shopping.

Based on the research based on the influence theory of reference group, in the context of mobile shopping, when consumers' emotions are stimulated to trigger impulsive shopping intentions, consumers are often influenced by reference groups. For example, in terms of the influence of informative reference groups, Consumers may refer to available information such as product sales and online reviews; in terms of utilitarian reference to group influence, such as in live broadcast rooms, consumers will gain appreciation from others by interacting with

other consumers, and when they gain group appreciation Then increase the willingness to buy impulse; in terms of value expression reference, when consumers see online reviews or interact with other consumers in the live broadcast room, it is easy to place themselves in this group, hoping to maintain the same behavior with the group through purchase.

To sum up, this paper will examine the moderating effect of reference group influence in the process of studying the influence of consumer sentiment on online impulse purchase intention. The moderating role of reference group influence will be examined, and the theoretical model of this paper will be finally formed as follows:

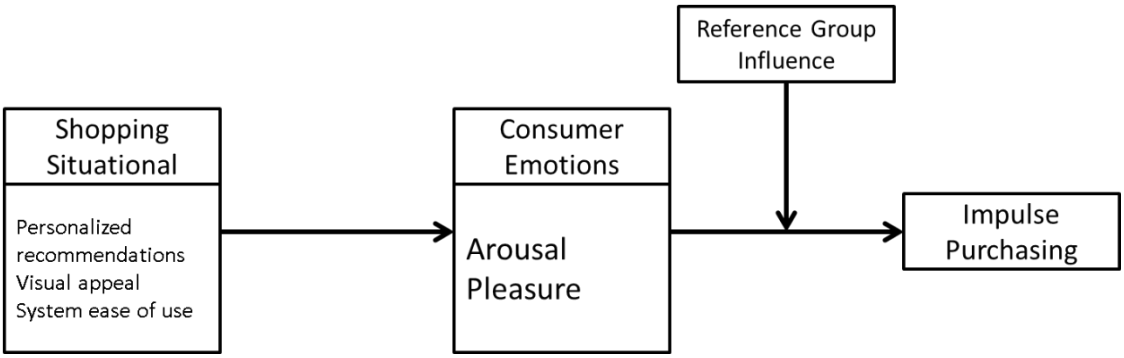

Figure 2: The theoretical model

Based on the above theoretical model, the assumptions are made as follows.

2. The influence of shopping environment stimuli on consumer sentiment

The research of scholars Holbrook and Hirschman shows that in different environments, consumers will have different emotions due to differences in lighting brightness, color and the overall environment atmosphere, such as feeling stimulated in a strong environment atmosphere, feeling in a relaxed environment atmosphere. Stress reduction and relaxation. The model of Parboteeah et al. proposes that environmental features of a website can elicit user cognitive and emotional responses (i.e., perceived usefulness and perceived pleasure). That is, a user's first impression of a website affects their evaluation of the usefulness of the website.

Different from offline physical stores, stores on the mobile platform have no physical space restrictions when displaying products, which can better meet the diverse needs of consumers. Many non-popular brands or products with very little transaction volume in daily life, can be displayed on the mobile web store. And many foreign products can also be reflected through this website. Consumers do not need to shop overseas at all, and they can meet the needs of these overseas products with the help of overseas purchases on the mobile platform. At the same time, scholars pointed out that with the application of advanced multimedia technology and the interaction of mobile terminal technology, consumers felt new good feelings in the virtual environment of mobile shopping, which led to changes in their inner emotions, such as more excitement and happiness, etc. . In the theoretical model, the mobile shopping virtual environment includes the following three dimensions: personalized recommendation, visual appeal and system ease of use. Consumers' psychological emotions include two dimensions: perceived arousal and perceived pleasure.

2.1 The Impact of Personalized Recommendations on Emotions

The rich variety of commodities on the mobile shopping website provides consumers with a variety of shopping choices, but at the same time it also increases the cost of choosing commodities for consumers, and it is easy for consumers to get lost in the massive information. The emergence of the personalized recommendation function solves this problem. This function can accurately predict the preferences and needs of consumers based on browsing history and purchase records, show consumers the products they need most, and help consumers in front of many product information. Make decisions quickly. This feature can reduce the time and effort consumers spend on picking items and make consumers have a positive attitude towards mobile shopping platforms. Existing research conclusions have confirmed that the personalized recommendation function can give consumers a sense of exclusive customization, thereby promoting consumers to have a positive emotional response]. The positive relationship between personalized recommendation and consumer emotional response has been supported by multiple studies. For example, Aljukhadar and Senecal believe that the personalized recommendation function can improve the user's mobile shopping experience. The more product recommendation information provided to consumers meets the needs of consumers, the higher consumers' trust in mobile shopping websites and their attitude towards mobile shopping. The more positive, the happier the consumer's mood. Based on the information processing theory, Pappas pointed out that in online shopping, the quality of the provided personalized content, information quality and personalized recommendation are very important, which can promote the formation of positive emotions.

In the context of mobile shopping, the rich variety of commodities brings consumers a variety of choices, but also increases the difficulty of consumers in searching for target commodities. In addition, mobile devices are usually more portable than PC devices, and the screen is generally biased. Small, it increases the time cost for consumers to select products. The personalized recommendation function can overcome the above problems. The preference prediction based on consumers' browsing history and purchase records can provide consumers with accurate product information, help consumers quickly locate the most suitable products, allow consumers to experience the convenience of mobile shopping, and awaken consumption. The positive shopping mood of consumers, and then feel the pleasure of the shopping process. Based on the above inferences, this paper argues that personalized recommendation can promote mobile consumers' perceived arousal and perceived pleasure. From this, it is hypothesized that:

H1a: Personalized recommendation has a positive impact on consumer sentiment.

2.2 The effect of visual appeal on mood

Similar to online shopping, in the context of mobile shopping, consumers are unable to try products, and lack of personal experience of products, so shopping websites need to display products in an all-round way in the form of multimedia, as far as possible to dispel consumers' lack of product experience. concerns in order to obtain a positive emotional response from consumers. In the study of Wells et al., visual appeal, a concept involving the visual elements

of a website, is regarded as a reflection of the emotionally related functions of a website. Images, for example, are visual elements that enhance the overall look of a mobile website, making users pay more attention to and value the information in the visual element. The research on PC-side shopping by Xiang et al. confirms that the diversification of product information display methods on shopping websites can help improve consumers' visual appeal, create the illusion of personal experience, make up for the lack of touch, and awaken consumers' positive emotions reaction. Huang believes that the more attractive the display interface of products on online shopping sites, the more consumers can identify with the products.

With the rapid development of smartphones, the display forms of mobile shopping have gradually become diversified, especially in terms of visual enjoyment, providing consumers with a variety of media forms. With the powerful functions of mobile technology, more and more rich presentation methods are adopted in the design of mobile online stores, resulting in visual complexity. However, compared with the PC side, due to the difference in screens and processing functions, when shoppers under mobile shopping use smartphones instead of tablets, there will be a feeling of crowded space, so the design needs to be based on the user's visual experience (Sohn et al., 2017). The mobile phone's gravity sensing, VR technology, AR technology, etc. have improved the experience of consumers' mobile shopping process. The interface design of mobile shopping websites, background music, live video and other media are combined to provide consumers with multiple shopping. enjoy. Based on the above viewpoints, it can be inferred that the higher the visual appeal of the mobile shopping website, the easier it is to arouse the consumer's emotions and the higher the consumer's sense of pleasure. A visually appealing mobile shopping website can stimulate and delight consumers and evoke a positive emotional response from consumers. Accordingly, this paper proposes the following assumptions:

H1b: Visual attractiveness has a positive effect on consumer sentiment.

2.3 The impact of system ease of use on emotions

With the popularity of e-commerce, online shopping is becoming more and more common. Compared with PC-side shopping, mobile shopping is not limited by space, and mobile devices are easy to carry, which has more advantages in system use. Specifically, mobile shopping consumers are both potential impulse buyers of shopping websites and users of the website system (Wu et al., 2016), and the ease of use of the system is very important to consumers. System usability refers to the ease and convenience that consumers perceive when using a mobile shopping system, and can easily browse websites in a system with good visual appeal, high-speed download and information security. The ease of use of the system promotes easy access to product information, and by increasing the speed of consumer information search, consumers' expectations can be satisfied in the shortest possible time. Therefore, the focus of system usability is to have a user-friendly interface to enhance customers' online shopping experience and enhance consumers' positive emotions (Luo et al., 2012).

Mobile devices such as mobile phones and tablets have become the items that people carry with them because of their small size. Consumers can turn on their mobile devices at any time and anywhere to experience shopping activities. With the advent of 4G network, the improvement of mobile phone configuration and the development of mobile payment technology, the operation steps of mobile shopping have been further simplified. Compared with offline shopping and even PC-side shopping, mobile shopping is more convenient. Scholars Hubert et al. studied the problem of mobile shopping based on smartphones, and proposed that the ease of use of applications has a positive effect on shopping sentiment and shopping tendencies. Referring to social psychology theory, in the process of mobile shopping, the use of mobile shopping systems by consumers can be compared to the interaction between consumers and individuals. If the mobile shopping system is easy to use, consumers will feel relaxed and unburdened in the shopping process. It is conducive to the awakening of its emotions and the generation of pleasure. It can be seen that unreasonable navigation design or high product search cost will reduce the usability of the mobile shopping system, make consumers have negative emotions, and will not generate unplanned purchase intentions. In addition, the operability of mobile shopping anytime, anywhere will also prompt consumers to prefer mobile shopping and generate positive emotions. Accordingly, this paper argues that:

H1c: System ease of use has a positive effect on consumer sentiment.

3. The influence of consumer sentiment on impulse purchase intention

Emotions are the main driver of consumers' impulse buying intentions. In the process of mobile shopping, consumers tend to have positive emotions after being stimulated by mobile situational factors. This kind of positive emotion usually makes it difficult for consumers to resist the temptation of products, and thus generate purchase impulses. When consumers' emotions are awakened and pleasure is dominant, they will overestimate their needs and economic strength, and they are prone to impulse purchases under the influence of such emotions; on the contrary, when consumers are in rational or negative emotions When they are in the state, they will have a clearer understanding of their own needs and economic strength, and will conduct in-depth inspections of the goods that need to be purchased, so there will be no plans that exceed the demand. In the process of mobile shopping, the strong emotional response of consumers due to environmental factors will enhance their cognition of mobile shopping websites, and increase consumers' participation in mobile shopping, thereby increasing the possibility of impulsive purchase intentions. Under the influence of mobile situational factors, consumers have large psychological fluctuations due to emotional arousal. This emotional response will not only cause consumers to pay attention to products, but also prompt consumers to purchase impulses to calm down their emotional responses. Perceived arousal will promote the generation of impulse purchase intention; in the same way, the pleasant emotions caused by mobile situational factors will also make consumers respond positively to the product and initiate impulsive purchase intention. It can be seen that consumers' positive emotional response, that is, perceived arousal and perceived pleasure, will have a positive impact on impulse purchase intention. From this, it is hypothesized that:

H2: Consumer sentiment has a positive effect on impulse purchase intention.

4. The Reference Group Influence's Regulation

Reference group influence is a key situational variable. In recent years, in the field of social psychology and consumer behavior research, a large number of studies have confirmed the involvement of reference group influence in the consumer decision-making process. And through experiments to prove that consumers' perception of informative influence affects their product evaluation. The works on interpersonal influence and social identity believe that people's consumption behavior is actually a way and means of social identity, and it is the process of maintaining or shaping individual social identity in the field of consumption.

Based on the research based on the influence theory of reference groups, in the context of mobile shopping, when consumers' personality traits are stimulated to trigger impulsive shopping intentions, consumers are often influenced by reference groups, such as the influence of informative reference groups. , consumers may refer to available information such as product sales, online reviews, etc.; in terms of utilitarian reference to group influence, such as in live broadcast rooms, consumers will interact with other consumers to gain other people's appreciation, and in the acquisition of groups Increase impulse purchase intention after appreciation; in terms of value-expressive reference, when consumers see online reviews or interact with other consumers in the live broadcast room, they are easy to place themselves in this group, hoping to maintain the same behavior with the group through purchases . From this, it is hypothesized that:

H3: Reference group influence has a regulation in the influence of consumer emotional influence on online impulse purchase intention.

Research Design and Hypothesis Testing

In order to study the influence factors of consumers' shopping environment and their own emotions on impulse purchase intention to conduct an effective and in-depth analysis, this paper mainly obtains relevant data and analyzes it through the questionnaire survey method. On the basis of referring to the previous relevant literature and sorting out, the relevant variables are operationally defined, which further ensures the stability and validity of the measurement. In the selection of the scale, through summarizing the relevant literature at home and abroad, the appropriate research variables are obtained and then the variables are measured. The final scale formed is as follows:

Table 1: Variable Measurement

Variable	Dimension	Question	Reference source

Shopping Situational	Personalized recommendations	Relevant mobile software automatically recommends new products	Dittmar H.(2005); Fu Junying (2018); Dorigo M (2016); Liu (2013)
		Related mobile software recommends products according to your preferences	
		Relevant mobile software can layout web pages according to your preferences, thus attracting your attention	
		Relevant mobile software can repeatedly push a product to increase your attention	
		Relatively large discounts on related mobile software	
	Visual appeal	More colorful display of related mobile phone software products	Liu Jiandi (2013); Shin (2006); Liu (2013)
		Relevant mobile phone software uses relevant dynamic technology to make you feel immersive	
		The concise interface of related mobile software makes you pleasing to the eyes	
		The surreal performance of related mobile software stimulates your senses	
	System ease of use	Related mobile software search will be more convenient	Kristof (2018) Shin (2006) Liu (2013)
		Relevant mobile phone software sales insurance regulations are improved	
		Relevant mobile software communicates with platform customers in a timely manner	
		Relevant mobile phone software provides feedback from time to time	
Consumer Emotions	Pleasure	happy	Pappas I (2017) Peck J (2006) Xiong Suhong (2009)
		satisfy	
		excited	
		relieved	
		I can't help feeling excited when I see a product	
	Arousal	I feel relaxed when I see a product	
		Seeing a certain product will arouse a strong desire to buy in the heart	
		Seeing a product makes one feel clear-headed	
Reference Group Influence	The sales of your favorite products on relevant platforms prompt you to buy		Shin H P (2004); Cheng Junmei (2013); Wang Danni (2019)
	Good reviews on related products prompt you to buy		
	The number of viewers when the relevant product is live will motivate you to buy		
	Live-streamed interactions with related products will drive you to buy		
Impulse Purchasing	It is easy to be attracted by shopping platform advertisements		Weun S (1998); Hao ZhengJun (2018); Xiong Xiaojuan (2016)
	Every time I see a new product, I feel like I have known each other		
	Just place an order for the item you like		
	Don't think about money when shopping		

1. Questionnaire pre-research

Based on the above scales, a questionnaire was designed, and the subject items of the questionnaire were measured using the Likert 5-point scale. According to the operation of the questionnaire survey procedure to expand its reliability and validity, this paper conducts a series of preliminary surveys before the formal survey. A total of 313 pieces of data were collected in the pre-investigation. The main respondents of the 313 questionnaires distributed in the pre-investigation were residents of the author's own province. The questionnaires were distributed offline. Invalid data were excluded. The actual number of valid questionnaires was 300. The effective rate of the questionnaire was 95.8%. Relevant reliability and validity tests were carried out based on the recovered data.

1.1 Reliability Test

This paper uses spss25 to process the relevant data of the relevant questionnaires and then analyzes it to obtain the items of each scale and the overall correlation coefficient, as well as the α coefficient of each part as shown in the table below. From the data in the table, it can be seen that the final value of each variable is greater than 0.7 , so it is not necessary to exclude items in any variable, and the overall value is greater than 0.7, it can be inferred that the scale has good reliability.

Table 2: Reliability test of each variable in pre-investigation

variable	number of questions	Cronbach Alpha
Personalized recommendations	5	0.962
Visual appeal	4	0.944
System ease of use	4	0.951
Consumer Emotions	8	0.978
Reference Group Influence	4	0.956
Impulse Purchasing	4	0.948

1.2 Validity Test

The validity of the pre-investigation questionnaire data was tested by exploratory factor analysis. The principal component analysis method was used to extract factors and select the standard whose eigenvalue was greater than 1, and the variance maximum orthogonal rotation method was used to rotate, and the factor analysis results were obtained. Factor analysis was carried out on the scale measurement questions of the questionnaire in this paper, mainly using kmo test and Bartlett sphericity test to judge whether the scale is suitable for factor analysis measurement. The results are as follows.

Table 3: Scale measurement item factor analysis results

variable	Kmo	Spherical test		
		approximate chi-square	degrees of freedom	companion probability
Personalized recommendations	0.869	1808.905	10	0
Visual appeal	0.867	1131.835	6	0
System ease of use	0.853	1253.538	6	0
Consumer Emotions	0.933	3536.392	28	0
Reference Group Influence	0.858	1308.061	6	0
Impulse Purchasing	0.877	1413.280	6	0

Table 4: KMO and Bartlett's test

KMO Sampling Suitability Quantity		.707
Bartlett's sphericity test	approximate chi-square	29008.206
	degrees of freedom	630
	salience	.000

The test results show that the KMO values of these 8 variables are all greater than 0.7. At the same time, the associated probability of their Bartlett sphere test is 0.000, and the Bartlett sphere test is passed, indicating that these 8 variables are suitable for factor analysis.

2. Formation of a formal questionnaire

After the reliability and validity test of each scale of the pre-investigation questionnaire, no items that did not meet the relevant evaluation standards were found, so it can be used as a scale to be measured. A total of 500 formal questionnaires were filled in, and 356 valid questionnaires were recovered. The recovery rate of valid questionnaires was 71.2%. When analyzing the data of the pre-survey questionnaire, some outdated scales are removed. Therefore, when combining the pre-survey questionnaire with the formal questionnaire, it is only necessary to remove the data of the pre-survey irrelevant scales and then integrate them. In addition to the pre-research questionnaires, the final valid questionnaires were 656. Based on these 656 questionnaires, in order to understand the basic situation of all the samples, this paper carried out a descriptive statistical analysis and described the data distribution as follows.

The proportion of males and females in the survey subjects is similar, of which 47.4% are women and 52.6% are men. In terms of age distribution, respondents under the age of 18

accounted for 34.1%, and respondents between the ages of 18 and 30 accounted for 31.1%. 34.8% are over 30 years old. When sorting out the data, it is found that the number of boys and girls is roughly the same, and the proportion of boys is larger. This is because many families in developed regions such as Zhejiang adopt a lifestyle where men take care of the inside and women outside the home. Men take care of children and do some housework at home, while women go out to work, which makes men use mobile phones to shop more frequently.

Analysis of their age groups found that the proportion of respondents in each age group was relatively uniform. This is due to the rise of smartphones, almost everyone in China has one, and using them for everyday shopping is the norm.

According to the distribution of educational background of the respondents, the proportion of respondents who have searched for higher education is close to 70%. The results show that in the distribution of the surveyed population, the proportion of males is slightly higher than that of females, and the educational background is relatively high. The most respondents spend 1-5 hours a day browsing their mobile phones, and most of them use mobile phones for more than 3 hours. According to the data, it is not difficult to find that the respondents have a strong curiosity and a high degree of acceptance of some high-tech products, mainly in the young and middle-aged. They have a certain adventurous spirit and are relatively easy to be stimulated by the external environment. , the desire to shop is stronger.

After conducting a series of investigations on the respondents, it is known that consumers do not focus on the shopping platform when they implement online shopping. Due to the rise of emerging platforms such as Douyin and Kuaishou, more and more people choose to click on links to buy goods while watching short videos. The types of goods they focus on are also different, and the distribution is relatively even. This is because the express delivery industry driven by the e-commerce industry has prompted consumers to accept online shopping.

3. Hypothesis Testing and Analysis

For the hypothesis put forward above, this paper uses multiple linear regression to analyze, this method can make the number of control variables unlimited, and can more intuitively reflect the role of independent variables. In addition, the multiple regression model can also directly interact with the variables in the model and fit them as a mediator variable. This article still uses spss25 to process related data.

3.1 Stimulation of shopping environment has a positive impact on consumer sentiment

The shopping environment stimuli in this paper are specifically divided into personalized recommendation, visual attractiveness and system ease of use. These three variables will affect consumers' emotions, and the changes in consumers' emotions will stimulate impulse purchases. Therefore, it is necessary to first analyze the relationship between the above three variables and consumer sentiment. The regression analysis is as follows.

Table 5: Summary of models for the impact of shopping environmental stimuli on consumer sentiment

Model	R	R square	adjusted R square	Error in Standard Estimation	change statistics				
					R-square change	F change	degrees of freedom 1	DOF 2	Significant F change
1	.980[a]	.959	.959	.20219690	.959	27.064	3	352	.000

Table 6: ANOVA analysis of the impact of shopping environmental stimuli on consumer sentiment

Model		sum of square	degrees of freedom	mean square	F	salience
1	return	340.609	3	113.536	27.064	.000b
	Residual	14.391	352	.041		
	Total	355.000	355			

a . Dependent Variable: Consumer Sentiment
b . Predictors: (Constant), System Ease of Use, Personalized Recommendations, Visual Appeal

Table 7: Influence coefficient of shopping environment stimulus on consumer sentiment

Model		Unstandardized coefficients		standardized coefficient	t	salience
		B	standard error	Beta		
1	(constant)	.964	.011		6.044	.000
	Personalized Recommendations	.324	.038	.324	8.429	.000
	visual appeal	.429	.041	.429	10.364	.000
	System ease of use	.242	.039	.242	6.211	.000

a . Dependent Variable: Consumer Sentiment

The data in the above table shows that personalized recommendation, visual appeal and system ease of use have a significant impact on consumer sentiment, F=27.064, P<0.001, and the proportion of consumer sentiment changes that can be explained by the above three variables is 95.9%, the influence is larger, indicating that the regression equation has a strong fit and a significant linear relationship.

According to the above model, it can be concluded that:

The personalized recommendation of the H1a mobile shopping platform has a positive impact on consumer sentiment, where the standardized coefficient β=0.324, P=0, indicating

that the hypothesis is true. Based on this, it can be seen that the stronger the shopping environment stimulates consumers, the stronger the willingness of consumers to make impulse purchases, and the higher the satisfaction.

The visual appeal of the H1b mobile shopping platform has a positive impact on consumer sentiment, where the normalized β=0.429, P=0, the hypothesis is true. The results show that the more beautiful the product display page for consumers on the mobile shopping platform, the more beautiful the text, and the more suitable the background music video is applied, the more positive attention it can attract consumers, and the stronger the resonance with consumers' emotions. , thereby increasing pageviews and browsing time.

The system ease of use of the H1c mobile shopping platform has a positive impact on consumer happiness, where the standardized β=0.242, P=0, the hypothesis is true. The results show that the system developed for consumers on the mobile shopping platform has a better feeling of use, can bring convenience and speed to users' operations, and can solve problems by interacting with online customer service in a timely manner, which can arouse the emotional resonance of consumers. thereby attracting consumers' attention.

3.2 Consumer sentiment has a positive impact on impulse purchase intention

The change of consumer sentiment in this paper will have a certain impact on impulse purchase intention. The regression analysis of the two variables is as follows.

Table 8: Model Summary of Consumer Sentiment Impact on Impulse Buying Intention

Mode l	R	R square	adjusted R square	Error in Standard Estimation	change statistics				
					R-square change	F change	degrees of freedo m 1	DOF 2	Significant F change
1	.953[b]	.908	.907	.30501916	.017	64.395	1	351	.000

a . Predictors: (Constant), Consumer Sentiment

Table 9: ANOVA analysis of the influence of consumer sentiment on impulse purchase intention

Model		sum of square	degrees of freedom	mean square	F	salience
1	return	322.344	4	80.586	66.175	.000[c]
	Residual	32.656	351	.093		
	Total	355.000	355			

a . Dependent variable: impulse buying intention
b . Predictors: (Constant), Consumer Sentiment

Table 10: Influence coefficient of consumer sentiment on impulse purchase intention

Model		Unstandardized coefficients		standardized coefficient	t	salience
		B	standard error	Beta		
1	(constant)	.514	.016		0.000	.000
	Personalized Recommendations	.645	.080	.645	8.025	.000

a . Dependent variable: impulse buying intention

It can be concluded from the table that consumer sentiment has a significant impact on the dependent variable impulsive purchase intention, F=66.175, P=0, which further verifies the theoretical hypothesis H2. From the above model, it can be concluded:

H2: Consumer sentiment has a positive impact on impulse purchase intention, where standardized β=0.645, P=0, the hypothesis is true. The results show that the more effectively a consumer's emotions are mobilized, the more likely they are to make impulse purchases.

3.3 The Regulation verification

In the context of mobile shopping, consumers are often influenced by reference groups when their personality traits are stimulated to trigger impulsive shopping intentions. For example, in terms of the influence of informative reference groups, consumers may refer to the sales of products. , online reviews and other obtainable information; in terms of utilitarian reference group influence, such as in the live broadcast room, consumers will gain appreciation from others by interacting with other consumers, and increase impulse purchase willingness after obtaining group appreciation; in value In terms of expressive reference, when consumers see online comments or interact with other consumers in the live broadcast room, it is easy to place themselves in the group, hoping to keep their actions consistent with the group by purchasing. Based on this, the questionnaire was used to verify H3: the reference group influence has a moderating role in the influence of consumer emotional influence on online impulse purchase intention, as follows.

Table 11: Moderating effect test analysis table

	Model 1					Model 2					Model 3				
	B	standard error	*t*	*p*	*β*	*B*	standard error	*t*	*p*	*β*	*B*	standard error	*t*	*p*	*β*
constant	0	0.017	0	1	-	0	0.017	0	1	-	0.012	0.025	0.462	0.645	-
consumer sentiment	0.946	0.017	55.158	0.000**	0.946	0.742	0.06	12.419	0.000**	0.742	0.727	0.065	11.274	0.000**	0.727
reference group influence						0.213	0.06	3.563	0.000**	0.213	0.216	0.06	3.598	0.000**	0.216
Consumer Sentiment*Reference Group Impact											-0.012	0.02	-0.622	0.034	-0.016
R^2 _	0.896					0.899					0.899				
Adjust R^2 _	0.895					0.899					0.899				
F _	*F* (1,354)=3042.401, *p* =0.000					*F* (2,353)=1577.788, *p* =0.000					*F* (3,352)=1050.160, *p* =0.000				
△ R^2 _	0.896					0.004					0				
△ F _	*F* (1,354)=3042.401, *p* =0.000					*F* (1,353)=12.692, *p* =0.000					*F* (1,352)=0.387, *p* =0.534				
Dependent Variable: Shopping Behavior															
* $p < 0.05$ ** $p < 0.01$															

As can be seen from the above table, the moderating effect is divided into three models, and model 1 includes the independent variable (consumer sentiment). Model 2 adds a moderator variable (referring to group influence) on the basis of model 1, and model 3 adds an interaction term (the product term of the independent variable and the moderator variable) on the basis of model 2.

For model 1, the purpose is to study the influence of the independent variable (consumer sentiment) on the dependent variable (shopping behavior) without considering the interference of the moderator variable (reference group influence). As can be seen from the above table, the independent variable (consumer sentiment) showed significant (t=55.158, p=0.000<0.05). It means that consumer sentiment has a significant impact on shopping behavior. The interaction item between consumer sentiment and the reference group will show significant (t=-0.622, p=0.034<0.05), and it can be seen from Model 1 that X has an impact on Y, which means that consumer sentiment has an impact on shopping behavior. When the moderator variable (reference group effect) is at different levels, there is a moderating effect.

Therefore, H3: Reference group influence has a moderating role in the influence of consumer emotional influence on online impulse purchase intention. The higher the reference group influence, the greater the influence of consumer sentiment on online impulse purchase intention.

Research Conclusions and Discussion

1. Research conclusions and value

Based on the SOR model, this paper explores the influencing factors and influence paths of shopping environmental stimuli on impulsive purchase intentions, and at the same time verifies the moderating effect of reference group influence in the influence of shopping

environmental stimuli on consumer sentiment. The following results are obtained. in conclusion:

First, this paper verifies the positive relationship between shopping environment stimuli and consumer sentiment from three aspects: personalized recommendation, visual appeal, and system ease of use. The study found that in the context of mobile shopping:

1) Personalized recommendation has a positive impact on consumer sentiment;
2) Visual attractiveness has a positive impact on consumer sentiment;
3) The ease of use of the system has a positive impact on consumer sentiment;

The effects of the three are relatively significant. The results of these studies confirm the applicability of the S-O-R model in the context of mobile shopping, further enriching the application of the S-O-R model.

Second, this paper verifies the positive relationship between consumer sentiment and impulse purchase intention. Stimulated by environmental factors of mobile shopping, consumer emotions have a positive impact on impulse purchase intention, which also confirms the research conclusions of relevant scholars that positive emotions can help promote consumer purchases. After receiving the stimulation of the shopping environment and triggering a strong emotional response, consumers will rely on the emotional response to make their own evaluation and judgment of the product, and then generate the impulse to buy the product.

Third, this paper verifies the moderating effect of reference group influence in the influence of consumer emotional influence on online impulse purchase intention. The study shows that after consumer emotion is stimulated, if the influence of the reference group is greater, the impulse purchase of consumers will be higher. The stronger the will.

This paper studies the formation mechanism of consumers' impulse purchase intention in the context of mobile shopping. Based on the S-O-R model, it explores the influencing factors of shopping environment stimuli on impulse purchase intention, which has certain theoretical significance. Most of the previous research results related to consumers' impulse buying behavior in mobile shopping simply connect the influencing factors with impulse buying behavior, and lack consideration of the correlation between consumers' psychological behavior and emotional changes. Secondly, in the process of intelligent development with big data and cloud computing as the main technologies, personalized intelligent recommendation centered on consumers is becoming more and more common. Originally, personalized recommendation was introduced as a shopping environment stimulus for research, which clearly distinguishes The mobile shopping environment is different from traditional PC online shopping. Finally, this paper uses the reference group influence as a moderator variable to verify that the reference group influence has a moderating effect in the influence of consumer emotional influence on online impulse buying intention, which makes up for the previous research on the relationship between reference group influence and consumer impulse buying behavior. It further expands the research in the field of impulse buying behavior.

2. Management advice

This paper discusses the influence of mobile shopping environment stimulus on impulse purchase intention, aiming to provide theoretical reference and suggestions for mobile shopping, and provide some reference for enterprises to formulate corresponding marketing strategies.

First, according to the conclusion of the impact of shopping environment stimulation on consumer sentiment, first of all, in terms of personalized recommendation, e-commerce platforms can focus on developing and upgrading their own intelligent recommendation algorithms to improve the accuracy of personalized recommendations, which can attract consumers. At the same time, the platform can also provide merchants with more information about old customers, so that merchants can make personalized recommendations for customers according to the hobbies of old customers, and further impress consumers By. Secondly, in terms of visual appeal, the platform can continuously upgrade and optimize its own interface design, improve the friendliness of the interface, make consumers more relaxed when shopping, easily search for products, improve consumers' sense of pleasure and awakening, and at the same time , you can use dynamic pictures, videos, live broadcasts and other newer visual attractive marketing methods to improve consumers' sense of pleasure and arousal. Finally, in terms of system ease of use, the platform can provide users with more convenient and easy-to-use product search methods, such as intelligent voice search, image search, classification query, etc. In addition, it can minimize the burden of consumers from finding goods to payment. link to improve the consumer experience.

3. Research deficiencies and prospects

Although the research in this paper has deepened and expanded consumers' online impulse purchase intention, it fills the theoretical gap in the related research on the formation mechanism of online impulse purchase intention, and also provides a theoretical reference for e-commerce enterprises to carry out online marketing and management practices. and suggestions, but there are still some deficiencies in the research. For example, different types of e-commerce platforms are not classified. Further research on the characteristics of different e-commerce platforms is where further research can continue to be deepened in the future. In addition, when consumers of different genders purchase different types of products, there will also be certain differences, which is where further research can continue to be deepened in the future.

References

Aljukhadar, M., & Senecal, S. (2011). Usage and Success Factors of Commercial Recomm Endation Agents: A Consumer Qualitative Study of My Product Advisor. *Journal of Research in Interactive Marketing, 5*(2): 130-152.

Beatty, S. E., & Ferrell, M. E. (1998). Impulse Buying: Modeling Its Precursors. *Journal of Retailing,* 74(2): 169-191.

Donovan, R. J., & RossiteR, J. R. (1982). Store Atmosphere: An Environmental Psychology Approach. *Journal of Retailing,* 58(1): 34-57.

He, Junhong., Li, Zhongxiang., & Du, Shangrong. (2018). Research on the influence of environmental stimuli on consumers' continual intention in mobile shopping: Based on an emotional perspective. *Forecast*, 37(2): 63-68.

Hee, P. C., Young-Hoon, P., & Schweidel, D. A. (2018). The Effects of Mobile Promotions on Customer Purchase Dynamics. *International Journal of Research in Marketing,* 35(3): 453-470.

Hoch, S. J., & Loewenstein, G. F. (1991). Time-inconsistent preferences and consumer self-control. *Journal of Consumer research,* 17(4): 492-507.

Huang, L. T. (2016). Flow and Social Capital Theory in Online Impulse Buying. *Journal of Business research*, 69(6): 2277-2283.

Hubert, M., Blut, M., & Brock, C., et al. (2017). Acceptance of Smartphone - Based Mobile Shopping: Mobile Benefits, Customer Characteris-tics, Perceived Risks, and the Impact of Application Context. *Psychology & Marketing,* 34(2): 175-194.

Khachatryan, H., Rihn, A., Behe, B., et al. (2018). Visual Attention, Buying Impulsiveness, and Consumer Behavior. *Marketing Let-ters*, 29(1): 23-35.

Li, Yalin., & Jing, Fengjie. (2014). The influence of business promotion stimulation on consumer satisfaction after impulsive purchase: the perspective of promotion methods and time changes. *Management Review*, 26(3): 81-88.

Li, Zongwei., Zhang, Yanhui., & Luan, Dongqing. (2017). What factors influence consumers' online purchasing decisions?——The driving role of customer perceived value. Management Review, 29(8): 136-146.

Liu, C. W., Hsieh, A. Y., & Lo, S. K. et al. (2006). What consumers see when time is running out: consumers' browsing behaviors on online shopping websites when under Reference Group. *Computers in Human Behavior,* (70): 39-397.

Luo, J., Ba, S., & Zhang, H. (2012). The Effectiveness of Online Shopping Characteristics and Well-Designed Websites on Satisfaction. *Mis Quarterly,* 36(4): 1131-1144.

Marriott, H. R., & Williams, M. D. (2018). Exploring Consumers Perceived risk and Trust for Mobile Shopping: A Theoretical Framework and Empirical Study. *Journal of Retailing and Consumer Services,* 42: 133-146.

Motyka, S., Grewal, D., & Aguirre, E., et al. (2018). The Emotional Review - Reward Effect: How do Reviews Increase Impulsivity?. *Journal of the Academy of Marketing Science*, 46(6): 1032-1051.

Pappas, I. O. (2018). User Experience in Personalized Online Shopping: A Fuzzy-Set Analysis. *European Journal of Marketing,* 52(7/8): 1679-1703.

Pappas, I. O., Kourouthanassis, P. E., & Giannakos, M. N., et al. (2017). Sense and Sensibility in Personalized E-commerce: How Emotions rebalance the Purchase Intentions of Persuaded Customers. *Psychology & Marketing,* 34(10): 972-986.

Petersen, F. E., Dretsch, H. J., & Komarova, Loureiro. Y. (2018). Who Needs a Reason to Indulge? Happiness Following Reason-Based Indul-gent Consumption. *International Journal of Research in Marketing,* 35(1): 170-184.

Qian, X., Feng, H., Zhao, G., et al. (2014). Personalized Recommendation Combining User Interest and Social Circle. *IEEE Transac-tions on Knowledge & Data Engineering,* 26(7): 1763-1777.

Rook, D. W., & GardneR, M. P. (1993) In the Mood: Impulse Buying's Affective Antecedents. *Research in Consumer Behavior,* 6(7): 1-28.

Smith, D., Pruitt, D., & Carnevale, P. (1982). Matching and mismatching: The effect of own limit, other's toughness, and Reference Group on concession rate in negotiation. *Journal of Personality and Social Psychology,* 42(5): 876-883.

Sohn, S., Seegebarth, B., & Moritz, M. (2017). The Impact of Perceived Visual Complexity of Mobile Online Shops on User's Satisfaction. *Psychology and Marketing*, 34(2): 195-214.

Van Dillen, L. F., Papies, E. K., & Hofmann, W. (2013). Turning a blind eye to temptation: how cognitive load can facilitate self-regulation. *Journal of Personality and Social Psychology,* 104(3): 427-443.

Watson, J. B. (1993). Psychology as the Behaviorist Views It. *Psychological review*, 101(2): 248-253.

Wells, J. D., Parboteeah, D. V., & Valacich, J. S. (2011). Online Impulse Buying: Understanding the Interplay between Consumer Impulsive-ness and Website Quality. *Journal of the Association for Information Systems,* 12(1): 32-56.

Wu, I. L., Chen, K. W., & Chiu, M. L. (2016). Defining Key Drivers of Online Impulse Purchasing: A Perspective of Both Impulse Shoppers and System Users. *International Journal of Information Management,* 36(3): 284-296.

Wu, J. H., & Wang, S. C. (2005). What Drives Mobile Commerce? An Empirical Evaluation of the Revised Technology Acceptance Model. *Information & Management*, 42(5): 719-729.

Xiang, L., Zheng, X., & Lee, M. K. O., et al. Exploring Consumers'Impulse Buying Behavior on Social Commerce Platform. *In-ternational Journal of Information Management,* 36(3): 333-347.

Xiao, S. H., & Nicholson, M. (2013). A multidisciplinary cognitive behavioral framework of impulse buying: a systematic review of the literature. *International Journal of Management Reviews,* 15(3): 333-356.

Zhang, Wei., Guo, Lihong., & Zhang, Wukang. (2018). Research on the relationship between enterprise management innovation, dynamic ability and competitive advantage. Science and Technology Progress and Countermeasures, 35(17): 91-99.

Zhang, Yunping., Yang, Youcai., & Niu, Huan. (2018). Financial efficiency, spillover effect and foreign direct investment in Shandong Province—A study based on the spatial dynamic panel Durbin model. *Management Review*, 30(12):32-41.